A REVISION OF THE LABIATAE OF THE INDIAN EMPIRE

(RECORDS OF THE BOTANICAL SURVEY OF INDIA) Volume XIV - No. 1

S. K. Mukerjee

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DR. S. K. MUKERJEE, M.Sc. (Cal.), Ph.D. (Edin.)
Curator of the Herbarium, Royal Botanic Garden, Sibpur, Calcutta

BISHEN SINGH MAHENDRA PAL SINGH
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By

Dr. S. K. MUKERJEE, M.Sc. (Cal.), Ph.D. (Edin.),

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FOREWORD.

The present work was taken up by me in October 1936, at the suggestion of Professor Sir William Wright-Smith, and it has been done under his guidance and supervision. Recently the Labiatæ of Asia, specially of the eastern parts have been thoroughly studied by Merrill, Ridley, Kudo and others. A revision of the Indian Labiatæ, therefore, will provide us with a complete account of the family for the whole of the south-eastern part of Asia.

For this revision I have examined about 20,000 sheets of Indian Labiates. In the Royal Botanic Garden, Edinburgh, where the whole of the work has been carried out, I examined all the sheets of Indian Labiatæ in the general herbarium and also in Sir George Watt's Indian Collections. From the Royal Botanic Garden, Sibpur (Calcutta), a large quantity of material amounting to more than 8,000 sheets, was sent on loan for my work. For this I am greatly indebted to Mr. C. C. Calder and to Dr. K. Biswas and I owe thanks particularly to the latter for much important information and for many suggestions regarding my work, as well as for other assistance.

In May 1937 and in January 1938, I visited London, and worked for a month in the Herbaria at the Royal Botanic Garden, Kew, and at the British Museum, where I examined all the Indian sheets of Labiatæ ; while material was also kindly sent to Edinburgh on loan from Kew for further study. I desire to express my thanks to Sir Arther Hill, Mr. A. D. Cotton and to Mr. C. E. C. Fischer of Kew, as well as to Dr. Ramsbottom and to Dr. G. Taylor of the British Museum for all their help. Dr. Taylor gave me much information about the literature, and some useful hints in making the key to the genera.

In Edinburgh, my thanks are due to Professor Smith, for all possible help and for opportunities made available for my work ; also to Dr. J. M. Cowan, Mr. W. E. Evans, Dr. H. R. Fletcher and Mr. J. T. Johnstone, in all of whom I always found readiness to remove any difficulty I might encounter.

I have included Burma and Baluchistan within the scope of my enquiry, and I have also taken in the Andaman Islands as well as the Nicobars, Maldives and Laccadives. I have also taken account of a few plants which have been found just beyond the Sikkim-Tibet border, and which may yet be found within the actual boundaries of the Indian Empire.

Dwarf perennial *herb*, thickly woolly. *Leaves* rhomboid or rounded, close-set. *Whorls* axillary, 6-flowered; flowers large. *Calyx* campanulate, membranous, 10-nerved, deeply 5-lobed; lobes acuminate equalling the tube. *Corolla-tube* included; limb bilabiate; upper lip large, galeate, compressed, arching over the short 3-lobed lower lip. *Stamens* 4, lower longer; the upper filaments thickened at the base; anthers conniving, villous; cells divaricate. *Disk* equal. Style subequally 2-fid at the apex. *Nutlets* large, broadly obovoid, triquetrous, truncate, glabrous.

Eriophyton Wallichianum Benth. in Wall. Pl. As. Rar. i 63, Lab. Gen. et Sp. 638, and in DC. Prodr. XII 549; Wall. Cat. 2070; Hook. f. Fl. Brit. Ind. IV 695.

Dwarf *herb*, 10-20 cm. high, densely clothed with long white wool, stem simple, stout, naked below, rootstock stout; wool about 5 mm. long or more, very soft. *Leaves* shortly petioled or subsessile, rounded or rhomboid and acute serrate, cuneate at the base; densely woolly on both sides; petiole flat; lamina 3-5 cm. in diam., venations palmately reticulate. *Whorls* axillary, 6-flowered; bracts filiform. *Calyx* about 2·5 cm. long, 5-lobed, lobes triangular, finely acuminate. *Corolla* 3-3·5 cm. long, yellow or pinkish yellow, tube included, galea pubescent. *Filaments* thickened at the base, anthers villous. *Nutlets* 4 mm. long, broadly obovoid, truncate.

HABITAT :—Nepal; Sikkim; Bhutan.

DISTRIBUTION :—Tibet.

52. Leucas R. Br.

Prodr. 504; Benth. Lab. Gen. et Sp. 603, and in DC. Prodr. XII 523; Boiss. Fl. Orient. IV 778; Hook. f. Fl. Brit. Ind. IV 680; Benth. ex Hook. f. Gen. Pl. II 1213; Briq. in Engl. and Pr. Nat. Pflanzenf. iv, 3, a, 450; Prain Beng. Pl. 854, and in Journ. As. Soc. Beng. lxxiv (1907) 717; Cooke Fl. Bomb. Pr. II 463; Duthie Fl. Upp. Gang. Pl. II 248; Gamble Fl. Madras 1143; Haines Bot. Bih. & Oris. 746; Ridley in Fl. Malay Penin. II 650; Kudo in Mem. Fac. Sc. Agri. II, 2, (1929) 205; Doan in Fl. Gen. Indo-Chine IV, 8, (1936) 1018.

Herbs or undershrubs. *Flowers* medium or small, in dense axillary, usually distant, less often terminal whorls. *Calyx* 10-nerved, often striate; mouth equal or oblique; teeth 6 to 10, usually unequal. *Corolla-tube* not exserted, annulate or not within; lower lip 3-fid, spreading, mid-lobe large; upper lip erect, concave, villous externally. *Stamens* 4, didynamous, the upper pair shorter, ascending under upper lip; anthers connivent; cells divaricate, ultimately confluent. *Disk* entire or lobed, unrform or enlarged anteriorly. *Style* subulate; upper lobe minute or obsolete. *Nutlets* ovoid, triquetrous, obtuse.

A. Calyx-tube bent, mouth oblique.

B. Calyx-mouth produced on the lower (anterior) side . urticaefolius.

B. Calyx-mouth produced on the upper (posterior) side.

C. Calyx-mouth glabrous within or minutely pubescent (all leaves linear or narrowly lanceolate).

D. Calyx-mouth wide, teeth equal (Himalaya and N. India) . . . . . hyssopifolia.

D. Calyx-mouth contracted, uppermost tooth longest.

E. Bracts equalling the calyx, with long marginal bristles; calyx distinctly ribbed . . . . . aspera.

E. Bracts smaller than the calyx, without bristles.

F. Leaves 4-8 mm. broad, margin not revolute, flowers in dense heads . lavandulaefolia.

F. Leaves 1-3 mm. broad, margin revolute flowers 1-5 together . . angustissima.

C. Calyx mouth hairy, within.

D. Bracts 1·5-2·5 cm. long, imbricating and forming an involucre, covering the floral heads . . . . . cephalotus.

D. Bracts about 1 cm. long, neither imbricating nor forming an involucre.

E. Upper calyx-tooth very long; bracts linear spinous; stem finely pubescent . . . . . martinicensis.

E. Calyx teeth equal; bracts lanceolate foliaceous; stem densely tawny-hispid . . . . . nutans.

A. Calyx-tube straight, mouth never oblique.

B. Leaf-margin entire.

C. Leaves linear to oblong, 2-10 mm. in breadth.

D. Slender herbs, scaberulous or minutely and sparsely hispid in all parts; whorls axillary (Concan & Poona) . . . . . longifolia.

E. Calyx-teeth 2·5 mm. long, the upper tooth much longer.

F. Erect herbs; corolla annulate within.

G. Stem patently hirsute (South India, Burma) . . . stricta.

G. Stem adpressed pubescent (Parasnath) . . . . . Clarkei.

F. Procumbent herbs, base woolly; corolla not annulate within (Mt. Abu) . . . . . macrantha.

E. Calyx-teeth 1 mm. long, almost subequal.

F. Calyx-mouth truncate not oblique (S. India) . . . . . diffusa.

F. Calyx-mouth very oblique.

G. Corolla 18 mm. long; lower lip longer than the tube . . zeylanica.

G. Corolla 10 mm. long, lower lip shorter than the tube . . Wightiana.

D. Low shrubs conspicuously tomentose or strigose in all parts; whorls usually terminal (globose, many-flowered).

E. Leaves and stem covered with long patent bristle-like hairs; peduncles very long 10-20 cm. . . . . suffruticosa.

E. Leaves and stem strigose or tomentose with minute adpressed hairs; peduncles about 5 cm. or less.

F. Bracts linear-lanceolate, equalling the calyx; all parts strigose . . rosmarinifolia.

F. Bracts setaceous, half as long as the calyx or shorter; all parts softly tomentose.

G. Leaves linear, 2-4 mm. broad . ternifolia.

G. Leaves linear-oblong, 5-10 mm. in breadth . . . . helianthemifolia.

C. Leaves lanceolate, 1-2·5 cm. in breadth . . lanceaetolia.

B. Leaf-margin crenate or serrate.

C. Whorls few, at apex of shoots. (Calyx densely villous at the throat.)

D. Leaves ovate (except sometimes in L. ciliata); teeth of calyx ½-⅓ the length of the tube, ciliate with spreading erect hairs.

E. Hairs on the upper lip of corolla rufus-brown; leaves narrowed to the base.

F. Leaves lanceolate (Him., Assam, Burma) . . . . . ciliata (see also below).

F. Leaves ovate.

G. Leaves glabrescent (S. Indian forms only) . . . . . ciliata.

G. Leaves tawny villous (S. India) . vestita.

E. Hairs on the upper lip of corolla white; leaf base rounded.

F. Tall shrubby plants; leaves 5-10 cm. long or more, villous, soft to the touch . . . . . lamiifolia.

F. Prostrate herbs; leaves 2-4 cm. long, hispid, or scabrid, rough to the touch . . . . . prostrata.

D. Leaves narrowly lanceolate; calyx teeth ¼-⅓ the length of the tube, with a few silky hairs.

E. Leaves leathery and rigid, obtuse, very scabrid . . . . . hirta.

E. Leaves hispid or tomentose, chartaceous, flexuous, acute at the apex.

F. Leaves chartaceous; bracts pectinately villous obscuring the calyces . eriostoma.

F. Leaves membranous; bracts filiform, hairy, calyces not obscured . . stelligera.

C. Whorls numerous, all axillary, remote. (Calyx usually naked at the throat, or sparsely hairy.)

D. Hairs on stem and branches erect or spreading.

E. Leaves ovate to orbicular, nearly as broad as long.

F. Leaves distinctly petioled, membranous.

G. Flowers distinctly pedicelled; calyx teeth minute, not exceeding 1 mm. (S. India) . . . . nepetaefolia.
G. Flowers sessile; calyx-teeth 2 mm. long (Burma) . . . . Helferi.
F. Leaves sessile, coriaceous.
G. Corolla annulate; leaves ovate . lanata.
G. Corolla not annulate; leaves suborbicular (Burma) . . . . Collettii.
E. Leaves narrowly lanceolate, about 4 times as long as broad (Chota Nagpur) . helicterifolia.
D. Hairs on stem and branches reflexed.
E. Stem terete; leaves tomentose below (Burma only) . . . . . teres.
E. Stem quadrangular; leaves tomentose below or not.
F. Leaves membranous, never densely tomentose below, generally glabrate or softly pubescent; calyx hispid on the ribs but not hoary.
G. Calyx 6 mm. long (Burma).
H. Perennial plant (leaf-apex acute) pilosa.
H. Flaccid annual (leaf-apex obtuse) flaccida.
G. Calyx 10 mm. long (S. India and to Beng.).
H. Whorls 2-4-flowered; stem procumbent, very slender . biflora.
H. Whorls 6- many-flowered; stem stout, erect or ascending (S. India).
I. Bracts minute, subulate, shortly hispid; leaf-apex acute . . . angularis.
I. Bracts lanceolate, as long as the calyx, ciliate; leaf-apex obtuse . . . pubescens.
F. Leaves chartaceous, densely white or grey-tomentose below (except in some varieties of L. mollissima); calyx hoary or hispid.
G. Bracts equalling the calyx (S. India) . . . . . marrubioides.
G. Bracts very minute.
H. Calyx 10 mm. long, mouth abruptly dilated (S. India) . chinensis.
H. Calyx 6 mm. long, mouth not dilated.
I. Leaves sessile, rounded at the apex, base cordate (Burma) . . . ovata.
I. Leaves usually petioled, acute or obtuse, base rounded or cuneate.
J. Leaves obtuse, rounded at the base, petiole very short . . montana.
J. Leaves acute, cuneate at the base, petiole up to 2·5 cm. . . mollissima.

1. Leucas urticaefolia R. Br. Prod. 504; Benth. in DC. Prodr. XII 524; Wight Ill. t. 176b. f. 10. and Ic. t. 1451; Boiss. Fl. Orient. IV 778; Hook. f. Fl. Brit. Ind. IV 680; Baker in Thiselton & Dyer, Fl. Trop. Afric. v. 489; Prain Beng. Pl. 855; Cooke. Bomb. Fl. II, 464; Duthie Fl. Up. Gag. Pl. II 249; Gamble. Fl. Madras 1149; Haines Bot. Bih. & Oriss. 747.

An erect hoary annual herb, 15-60 cm. high, with square stem. *Leaves* petioled, ovate, or often lanceolate, obtuse coarsely serrate, cuneate at base, softly pubescent or hoary or often glabrous; lamina 3-5 cm. long; petiole ·5-1 cm. long. *Whorls* many-flowered, dense, globose, usually axillary; bracts almost equalling the calyx, ciliate. *Calyx* membranous, cylindric, 8-12 mm. long, reticulated, pubescent or villous outside, sparsely hairy within; mouth oblique, split above, produced on the anterior-side; ribs ending into minute spinulose teeth. *Corolla* white, tube slender, not annulate. *Nutlets* truncate and glandular at the top, 1·5 mm. long.

HABITAT :—From Beluchistan and Punjab to Behar; Sind; Gujrat; Rajputana; Central and S. India. (Mostly in plains.)

DISTRIBUTION :—Arabia; Nubia.

2. Leucas hyssopifolia Benth. in Wall. Pl. As. Rar. i 60, Lab. Gen. et Sp. 615, and in DC. Prodr. XII 531; Wall. Cat. 2044; Hook. f. Fl. Brit. Ind. IV 690; Collett Fl. Sim. 405; Prain Beng. Pl. 855; Duthie Fl. Upp. Gang. Pl. II 250; Haines Bot. Bih. & Oriss. 751.

Perennial suffruticose *herb*, with many stems and branches from a stout woody rootstock, very much hispid. *Leaves* subsessile, 3-7 cm. long, linear, obtuse, margin entire and usually recurved, pubescent with stiff hairs on both surfaces. *Whorls* small, terminal and axillary; bracts slender and subulate, spinulose, almost equalling the calyx. *Calyx* about 6 mm. long, obconic, glabrous; mouth wide truncate glabrous within; teeth erect, very minute, mucroniform. *Corolla* white, tube slender, scarcely longer than the calyx, pubescent above. *Nutlets* 3 mm. long, greyish brown, glandular-punctate, truncate at the top.

HABITAT :—Jamu (Kashmir ?); Simla; Dehra Dun; N. Oudh; Sikkim; Sambalpur District; Burma.

3. Leucas aspera Spreng. Syst. ii 743; Benth. Lab. Gen. et Sp. 615, and in DC. Prodr. XII 532; Miq. Fl. Ind. Bat. 982; Hook. f. Fl. Brit. Ind. IV 690; Prain Beng. Pl. 855; Cooke Fl. Bomb. Pr. II 645; Duthie Fl. Upp. Gang. Pl. II 250; Gamble Fl. Madras 1150; Haines Bot. Bihar & Oriss. 751; Merrill Enum. Philip. Fl. Pl. 410; Doan in Fl. Gen. Indo-Chine iv, 8, (1936) 1019.

Phlomis aspera Will in Link. Enum. Hort. Berol ii, 113.

Leucas Plunkenetii Benth. in Wall. Pl. As. Rar. i, 60; Wall. Cat. 2522.

L. dimidiata Benth. in DC. Prodr. XII 532.

Phlomis Plunkenetii Roth. Nov. Sp. 261.

P. esculenta Roxb. Fl. Ind. iii, 10.

Erect or diffuse *annual*, with much-branched stem. 30-60 cm. high, hispid or scabrid. *Leaves* shortly petioled or subsessile, 3-8 cm. long, linear, or narrowly oblong-lanceolate, obtuse, base narrow, margin entire or obscurely crenate, more or less pubescent on both surfaces. *Whorls* terminal or axillary, very dense- and many-flowered; bracts linear, ciliate, sub-spinulose, almost equalling the calyx. *Calyx* 8-12 mm. long, tubular, curved, constricted above the nutlets, usually smooth and glabrous below, ribbed and scabrid or hispid above; mouth small, very oblique, produced on the upper side, glabrous within or pubescent; teeth short, triangular, spinulose, ciliate, the upper one largest. *Corolla* about 10 mm. long, white. *Nutlets* 2·5 mm. long, smooth, brown.

HABITAT :—Punjab to Sikkim, Behar, Bengal, Assam, Burma; Bombay Pr.; Central and S. India.

DISTRIBUTION :—Mauritius; Java; Indo-China; Phillippines.

4. Leucas lavandulaefolia Rees Cyclop. XX, n. 2 (1819); Prain in Journ. As. Soc. Beng. lxxiv, 2, 719; Ridley Fl. Mal. 650.

L. linifolia Spreng. Syst. ii 743; Hook. f. in Fl. Brit. Ind. IV 690; Prain Beng. Pl. 856; Cooke Fl. Bomb. Pr. II, 465; Duthie Fl. Upp. Gang. Pl. II, 250; Gamble Fl. Madras 1149; Haines Bot. Bih. & Oris. 751.

Phlomis linifolia Roth Nov. Sp. 260 (1821).

P. zeylanica Roxb. Fl. Ind. III, 9; Jacq. Ic. Pl. Rar. I, 11, t. 111 (not of Linn.).

Leonurus indicus Burm. Fl. Ind. 127.

Herba admirationis Rumph. Herb. Amboin. VI. t. 16, f. 1.

An erect, slender, annual *herb*. 30-60 cm. high usually branching. *Stems* and branches 4-angled, finely adpressed-puberulous. *Leaves* opposite, herbaceous, finely puberulous on both surfaces, rather pale-green, linear-lanceolate, less often lanceolate, subacute; base tapering gradually from about the middle, entire; margin elsewhere entire in linear-lanceolate leaves, sometimes remotely and sparingly serrate in lanceolate ones; petiole usually very short or obsolete, rarely as much as 1 cm. long. *Floweres* subsessile or shortly pedicelled, in axillary and terminal but always leafy whorls, and always towards apex of stem and branches; bracts 8 mm. long, narrowly linear, subspinescent, finely puberulous. *Calyx* 9 mm. (in fruit 11 mm.) long behind, 5-7 mm. long in front, sparingly puberulous or glabrous externally; tube curved; mouth pubescent within with adpressed white short hairs, contracted, very oblique, rounded below, and forming above a large acute lobe much produced forward and tipped by a minute spinescent tooth; the remaining teeth variable in number, also minute, distant, erect along the oblique margin, usually 3, occasionally 4, sometimes only 2 on each side, with

often a small tooth in the centre of the rounded sinus opposite the acute posterior lobe. *Corolla* white, medium, 12 mm. long; tube 7 mm. long, annulate within near the middle; lower lip patent, the mid-lobe large, obovate, rounded, lateral lobes small; upper lip oblong, white-woolly. *Nutlets* 2 mm. long, oblong, rounded at apex; inner face angular, outer-rounded; pale-brown, dull.

HABITAT :—Concan; S. India; Behar; Dehra Dun; Bengal; Assam; Burma.

5. Leucas angustissima Sedgwick Journ. Ind. Bot. ii 123 (1921).

Erect *herb* of rocky places, about 30 cm. high, with a stout woody rootstock, branching from the base. *Leaves* very narrow, linear, up to 3 cm. long, and 3 mm. broad, margin revolute. *Whorls* few-flowered, all axillary; pedicels very short. *Calyx* 6 mm. long, slightly curved, and trumpet-shaped; minutely hispid outside, glabrous within, mouth oblique, not hairy, projected above; the upper tooth slightly longer, other teeth very short. *Corolla* conspicuous, about 15 mm. long, upper lip short, white-villous, lower lip spreading, about twice as long as the tube, deflexed, puberulous outside, 3-lobed, the lateral lobes narrow, decurved, the middle lobe about 7 mm. broad, emarginate.

HABITAT :—Canara, at Gairsoppa Falls and at Siddhapur.

6. Leucas cephalotes Spreng. Syst. ii 743; Benth. in Wall. Pl. As. Rar. i 60, Lab. Gen. et Sp. 616, and in DC. Prodr. XII 532; Wall. Cat. 2043; Wight Ic. t. 337; Boiss. Fl. Orient. IV 779; Hook. f. Fl. Brit. Ind. IV 689; Collett Fl. Sim. 405; Prain Beng. Pl. 856; Cooke Fl. Bomb. Pr. II 466; Duthie Fl. Upp. Gang. Pl. II 251; Gamble Fl. Madras 1150; Haines Bot. Bih. & Oris. 750.

Leucas capitata Desf. Mem. Mas. Par. xi (1824) 8, t. 4.

Phlomis cephalotus Roth. Nov. Sp. 262; Roxb. Fl. Ind. iii, 10.

Erect, stout *annuals*, 30-100 cm. high, scaberulous or pubescent with spreading hairs. *Leaves* shortly petioled, 3-10 cm. long, narrowly ovate, or ovate-lanceolate, subacute, crenate-serrate, base cuneate, softly pubescent with soft hairs above, rather long and spreading hairs beneath; lower surface glandular-punctate. *Whorls* globose, very large, about 3-5 cm. in diam., usually terminal, dense- and many-flowered; bracts 1·5-2·5 cm. long numerous, imbricating, and forming an involucre, covering the floral heads, lanceolate, acute and awned rigidly ciliate. *Calyx* about 2 cm. long, tubular, curved, glabrous below, pubescent above on the outside and also within; mouth oblique, produced on the upper side; teeth short, subulate. *Corolla* about 2·5 cm. long, white; lower lip slightly longer than the upper. *Nutlets* 3 mm. long, smooth brown.

HABITAT :—Throughout India from Sind to Assam, and Kashmir to Deccan.

DISTRIBUTION :—Afghanistan.

7. **Leucas martinicensis** R. Br. Prodr. 504; Benth. in Wall. Pl. As. Rar. i 60, Lab. Gen. et Sp. 617, and in DC. Prodr. XII 533. Hook. f. Fl. Brit. Ind. IV 688; Baker in Thiselton-Dyer, Fl. Trop. Afric. v. 479; Prain Beng. Pl. 856, and in Journ. As. Soc. Beng. lxxiv II 718; Cooke Fl. Bomb. Pr. II, 467; Gamble Fl. Madras 1149; Haines Bot. Bih. & Oris. 750.

L. polycephala Wall. Cat. 2051.

Phlomis martinicensis Sw. Prodr. Veg. Ind. Occ. 88.

A tall, stout annual *herb*, 60-120 cm. high, more or less branched. *Stem* and branches hirsute, 4-angled and 4-grooved, angles rounded. *Leaves* opposite, membranous, hirsute above and below, ovate, oblong or wide-lanceolate, obtuse; base cuneate, rarely rounded, entire; margin elsewhere widely and rather deeply crenate; 6-9 cm. long, 2·5-4 cm. wide; petiole hirsute, 10-18 mm. long. Flowers sessile, in numerous, distant, axillary, globose, many-flowered whorls which are 2-3 cm. across; the floral leaves decreasing upwards, especially in width of blade and length of petiole; bracteoles green, 6-9 mm. long, narrowly linear-lanceolate or subulate, spinescent at their tips with pale slender awns. *Calyx* 10 mm. (in fruit 15 mm.) long, tubular, sigmoid, pubescent externally; tube within glabrous and closely reticulate; mouth with a few short villi within, oblique; teeth 10, all lanceolate, ciliate, with fine spinescent tips; the uppermost largest, 5 mm. long; the others alternately longer and shorter. *Corolla* white, small, about 1 cm. long; tube 5 mm. long, not annulate within; lower lip spreading, the lateral lobes oblong rounded, wider than the oblong 2-fid central; upper lip erect, white-villous. *Nutlets* 2·5 mm. long, obovoid-oblong, obliquely truncate at apex, angular on inner face, rounded on outer, dark-brown, shining.

HABITAT :—All over S. India.

DISTRIBUTION :—Trop. Africa; Malay Peninsula; Trop. America.

8. **Leucas nutans** Spreng. Syst. ii, 743; Benth. Lab. Gen. et Sp. 616, and in DC. Prodr. XII 532; Hook. f. Fl. Brit. Ind. IV 688; Prain Beng. Pl. 865; Cooke Fl. Bomb. II 466; Duthie Fl. Upp. Gang. Pl. II, 251; Gamble Fl. Madras 1149; Haines Bot. Bih. & Oris. 750.

L. decurva Benth. in Wall. Pl. As. Rar. i, 60, and Cat. 2050.

Phlomis nutans Roth. Nov. Sp. 263.

Dwarf annual *herb*, 10-30 cm. high, often with straggling and diffuse branches; laxly hairy. *Leaves* shortly petioled, often sessile, 2-5 cm. long, oblong or oblong-lanceolate, obtuse, closely serrate or subserrate, pubescent with short hairs, on both surfaces and with long hairs on the nerves beneath. *Whorls* terminal or subterminal, many-flowered; bract. lanceolate, ciliate, almost equalling the calyx or shorter. *Calyx* 8-10 mm. long, membranous, falcately decurved in the middle, strongly ribbed above, hispid outside and pubescent within; mouth oblique; teeth subequal, lanceolate, ciliate longer than the hairs of the mouth. *Corolla*

white, about 15 mm. long; tube slender annulate near the base; lower lip longer than the upper. *Nutlets* 3 mm. narrowly oblong ellipsoid; smooth, brown.

HABITAT :—From Sind to Burma and Punjab to S. India; mostly in plains.

9. Leucas longifolia Benth. Lab. Gen. et Sp. 744, and in DC. Prodr. XII 527; Hook. f. Fl. Brit. Ind. IV 684; Cooke Fl. Bomb. Pr. II 468.

Erect rigid *annuals*, 20-50 cm. high, branching on the upper part of the stem; glabrous below, scaberulous or sparsely hispid above, with erect or spreading hairs. *Leaves* sessile, 3-6 cm. long, narrowly linear, obtuse, entire, narrowed to the base, more or less pubescent on both surfaces. *Whorls* usually axillary, few-flowered; bracts minute, subulate, pubescent. *Calyx* 6 mm. long, sessile, hispid; mouth truncate wide, villous within; teeth 10, very small. *Corolla* 16 mm. long; tube slender, exserted, annulate within; upper lip very short, lower much longer and very wide, 3-lobed. *Nutlets* 2·5 mm. long, rounded at the top.

HABITAT :—Konkan; Poona; Belgaun.

DISTRIBUTION :—Ceylon.

10. Leucas stricta Benth. in Wall. Pl. As. Rar. i 61, Lab. Gen. et Sp. 614, and in DC. Prodr. XII 531; Wall. Cat. 2045; Hook. f. Fl. Brit. Ind. IV 688; Prain Beng. Pl. 856; Cooke Fl. Bomb. Pr. II 467; Gamb. Fl. Madras 1150; Haines Bot. Bih. & Oris. 750.

Erect slender annual, 15-25 cm. high, hispidly hairy; branches often diffuse. Leaves sessile, linear or linear-oblong, obtuse, usually entire, narrowed to the base, hispid on both sides, glandular beneath. *Whorls* solitary and terminal, on the branches, or sometimes another is present below the terminal one; bracts filiform, rigid, ciliate. *Calyx* about 10 mm. long, tube narrowly funnel-shaped, erect, nearly straight, shortly and closely pubescent or somewhat glabrescent; mouth oblique densely villous within; teeth sometimes as long as the tube, very slender, ciliate. *Corolla* white; lower lip large, obtuse, much longer than the upper lip; tube of corolla included. *Nutlets* 3 mm. long, rounded at the top, smooth brown.

HABITAT :—Bombay; Central & S. India; Orissa; Burma.

11. Leucas Clarkei Hook. f. Fl. Br. Ind. IV 688; Prain Beng. Pl. 856; Haines Bot. Bih. & Oris. 750.

Slender *annuals*, 30-60 cm. high, with long ascending simple branches from the base, sparesly and adpressedly hairy with deflexed hairs. *Leaves* sessile or subsessile, 3-6 cm. long, linear or linear-lanceolate, obtuse, entire or subserrate, narrowed to the base, adpressedly hispid with scattered long bristle-like hairs above or scabrid, hirsute on the lower surface. *Whorls* terminal, subglobose; bracts very slender, ciliate, as long as the tube. *Calyx* 6 mm. long, slightly decurved, pubescent;

mouth wide, oblique, densely villous; teeth slender, 3 uppermost much the longest, scabrid, acicular at the tips. *Corolla-tube* included, upper lip short, narrowly oblong, lower very wide, about 10 mm. long. *Nutlets* 2 mm. long, rounded at the apex, smooth.

HABITAT :—Chota Nagpur.

12. Leucas macrantha Blatter & Hallb. Journ. Ind. Bot. ii, 47 (1921).

Procumbent *herb*, woody at the base, sparsely hirsute; stem and branches ascending, quadrangular, grooved. *Leaves* sessile or subsessile, about 4 cm. long, 0·8 cm. broad, lanceolate or linear-lanceolate, subacute, entire, cuneate at the base, sparsely hirsute sometimes only on the margin and nerves beneath. *Flowers* in more or less continuous whorls, usually terminal; whorls dense, about 20-flowered; pedicels minute; bracteoles numerous, acicular, equalling the calyx, long hirsute. *Calyx* tubular, slightly inflated in front, 10-nerved, about 10 mm. long, delicately pubescent outside, hirsute on the nerves and teeth, glabrous inside except with a ring of hairs in the throat, teeth 10, needle-shaped, the uppermost tooth largest; mouth oblique. *Corolla* white, 22 mm. long, tube subincluded, glabrous within; upper lip straight, concave, densely white-villous; lower lip 3-lobed, flat; the median lobe much larger, lateral minute, revolute, acute. *Nutlets* ovoid, triquetrous, 3 mm. long, longitudinally-rugose.

HABITAT :—Rajputana, Mt. Aboo, 1,200 m., *Hallberg*.

13. Leucas diffusa Benth. Lab. Gen. et Sp. 615, and in DC. Prodr. XII 531; Gamble Fl. Madras 1150.

Small diffusedly branched *annual*, hispid or hirsute; branches slender, ascending. *Leaves* sessile, 1·5-3·5 cm. long, linear or linear-oblong, obtuse, subentire, narrowed to the base, hispid with long bristle-like hairs above and on the mid-rib beneath, lower surface tomentose. *Whorls* solitary and terminal on the end of branches, few-flowered; bracts slender ciliate, shorter than the calyx. *Calyx* 6 mm. long, curved, smooth and glabrous below, ribbed and hispid above with long scattered hairs, mouth wide, more or less truncate, villous within; teeth small, subulately triangular, subequal. *Corolla* large, white. *Nutlets* 2·5 mm. long, rounded at the top, smooth, brown.

HABITAT :—Deccan peninsula, mostly on the eastern parts.

14. Leucas zeylanica R. Br. Prodr. 504; Benth in Wall. Pl. As. Rar. i 60, Lab. Gen. et Sp. 614, and in DC. Prodr. XII 531; Wight Ill. t. 176; Hook. f. Fl. Brit. Ind. IV 689; Cooke Fl. Bomb. Pr. II 465; Prain in Journ. As. Soc. Beng. lxxiv, 2, 718; Ridley Fl. Mal. Pen. II 650; Merril Enum. Philipp. Fl. Pl. III 411; Gamble Fl. Madras 1150; Kudo in Mem. Fac. Sc. & Agri. II, 2, (1929) 208; Doan Fl. Gen. Indo-Chine IV 8, (1936) 1020.

L. involucrata Benth. in Wall. Cat. 2047; Prain Beng. Pl. 856.

L. diffusa Woodr.

Phlomis zeylanica Linn. Sp. Pl. 820.

Leonurus marrubiastrum Burm. Fl. Ind. 127, not of Linn.

Nepeta hirsuta Lour. Fl. Coch., 366, not of Linn.

An erect annual *herb*, 15-50 cm. in height, simple or branched. *Stems* and branches 4-angled, hispidulous with scattered spreading hairs. *Leaves* opposite, decussate, membranous, dark-green above, uniformly but sparsely beset with spreading hispidulous hairs, paler and subglaucescent beneath, with spreading hispidulous hairs on the nerves, the hairs on both sides curved towards leaf-apex, ovate-lanceolate, or occasionally lanceolate, acute; base long-cuneate, entire; margin elsewhere entire or remotely and sparingly serrate; 3-7 cm. long, 5-12, rarely 15 mm. wide; petiole 2·5-5 mm. long, hispidulous. *Flowers* sessile or subsessile, in terminal usually 6- to 8-fld. whorls, 12-20 mm. across, occasionally axillary whorls occur below; bracts 5 mm. long, linear, spinescent, hispidulous along the margin with stiff spreading hairs. *Calyx* 5 mm. (in fruit 8 mm.), long, turbinate, slightly curved; the tube below glabrous or faintly pubescent externally, above beset with scattered, spreading, hispidulous hairs; the mouth subcampanulate, oblique, distinctly transversely veined between the 10 nerves, and sparingly pubescent within with short white hairs, the uppermost of which project beyond the limb; teeth 8, the uppermost 1·5 mm. long, slightly longer than the others, all subulate, spinescent at the tip. *Corolla* white, medium, 12 mm. long; tube 5-6 mm. long, glabrous below, enlarged upwards where pubescent externally, annulate within near the middle; lower lip patent, the midlobe large, shortly widely clawed, the lateral lobes small; upper lip obovate, white-woolly. *Nutlets* 3·5 mm. long, obovoid-oblong; apex subtruncate; inner face angular, outer rounded; dark-brown or black, shining.

HABITAT :—Assam; Chittagong; S. India.

DISTRIBUTION :—Ceylon; Malay Peninsula and islands; China.

15. Leucas Wightiana Benth. Wall. Pl. As. Rar. i 60; Wall. Cat. 2520; Hook. f. Fl. Brit. Ind. IV 690; Gamble Fl. Madras 1150.

L. aspera, var. *Wightiana*, Benth. Lab. 616, and in DC. Prodr. XII 532.

A small erect annual *herb*, 15-25 cm. high, with short branches, scabrid. *Leaves* sessile, 2-5 cm. long, linear, obtuse, margin entire, or very distantly and obscurely serrate, flat or recurved, scabrid or adpressedly hairy on both surfaces. *Whorls* small, axillary and terminal, close above, often forming a cylindric spike; bracts slender, densely hispid, almost equalling the calyx or shorter. *Calyx* 6 mm. long, membranous below, striated above; tube erect, not constricted in the middle, hispid outside, and villous at the very oblique and wide mouth; teeth triangular, sharply pointed, irregular, upper longer. *Corolla* very

small, the lips almost equal. *Nutlets* 2 mm. long, covered with a thin greyish colour.

HABITAT :—S. India, from Carnatic to C. Comorin.

16. Leucas suffruticosa Benth. Lab. Gen. et Sp. 611, and in DC. Prodr. XII 528; Wight Ic. t. 1454; Hook. f. Fl. Brit. Ind. IV 685; Gamble Fl. Madras 1152.

A low *undershrub*, much branched from a very long and stout rootstock; branches slender, rigid, terete, ascending, densely fulvus-tomentose or hispid. *Leaves* sessile, 1·5-3 cm. long, coriaceous, linear, obtuse, margin entire and recurved, upper surface hispid with conspicuous, long, erect, bristle-like hairs, white tomentose beneath. *Whorls* few, terminal on a very long peduncle, about 10-20 cm. in length; bracts setaceous, half as long as the calyx. *Calyx* 6 mm. long, villous; mouth not oblique, villous within; teeth erect, spinulose, longer than the hairs at the mouth; the calyx and the long peduncle very fine golden yellow in colour. *Corolla* white; tube included; the upper lip conspicuously white-bearded, galea densely villous. *Nutlets* 3 mm. long, terete, smooth.

HABITAT :—S. India.

17. Leucas rosamarinifolia Benth. Wall. Pl. As. Rar. i 61; Lab. Gen. et Sp. 612, and in DC. Prodr. XII 528; Wall. Cat. 2521; Wight Ic. t. 1455; Hook. f. Fl. Brit. Ind. IV 685. Gamble Fl. Madras 1152.

A small much-branched *shrub*, with woody, terete stem, strigose with erect hairs. *Leaves* fascicled, sessile, 2-3 cm. long, linear, obtuse, margin entire, revolute, upper surface strigose with minute erect hairs, greyish tomentose beneath. *Whorls* often solitary, usually on peduncles, which are up to 5 cm. long; bracts linear, rigid, strigose, almost equalling the calyx. *Calyx* sessile, about 6 mm. long, campanulate, hispid or villous, straight; mouth not oblique, villous within; teeth minute erect, triangular. *Corolla* white, *Nutlets* 3 mm. long, obtuse, yellowish brown.

HABITAT :—W. Ghats; Nilgiri hills.

18. Leucas ternifolia Desf. in Mem. Mus. xi 4, t. 1. f. 2; Benth. Lab. Gen. et Sp. 612, and in DC. Prodr. XII 529; Gamble Fl. Madras 1152.

L. helianthemifolia Hook. f. Fl. Brit. Ind. IV 685, in part.

A small much-branched *undershrub*, with a stout rootstock; pubescent with subsilky, yellow hairs; branches terete, slender. *Leaves* usually in whorls of 3, often opposite, sessile, 2-3 cm. long, narrowly linear, obtuse or subacute, margin entire and revolute, upper surface and the mid-rib beneath densely tomentose with adpressed hairs, lower surface covered with a greyish down. *Whorls* usually 2 at the end of each branch, flowers usually few in each whorl; bracts subulate, half as long as the calyx. *Calyx* about 6 mm. long, campanulate, straight, densely and finely tomentose; mouth straight, rather truncate, villous within; teeth minute. *Nutlets* 2 mm. long, chocolate brown, truncate and hairy (?) at the top.

HABITAT :—W. Ghats; Travancore; Anamalaya and Pulney hills.

19. Leucas helianthemifolia Desf. Mem. Mus. Par. xi (1824) 2. t. 1, f. 1. Benth. Lab. Gen. et Sp. 612, and in DC. Prodr. XII 528; Hook. f. Fl. Brit. Ind. IV 665 (in part); Gamble Fl. Madras 1152.

Leucas ternifolia Wight Ic. t. 1453, not of Desf.

A small *shrub*, about 30 cm. high or more, with woody, terete, much branched stem, densely and softly villous, very white, specially on the inflorescence; hairs erect or spreading. *Leaves* usually ternate or the upper ones opposite, sessile, coriaceous, 2-5 cm. long, 5-10 mm. broad, linear-oblong, obtuse, sometimes narrowed downwards from the middle, margin entire and revolute, upper surface green, fulvus-tomentose or villous, lower surface covered with white or tawny wool. *Whorls* chiefly terminal, few or many, often crowded; bracts subulate, almost as long as the calyx, tomentose. *Calyx* straight, sessile 6 mm., turbinate, densely woolly, mouth not oblique; throat densely villous with a ring of long hairs; teeth 10, minute erect. *Corolla* very short, white, upper lip clothed with a very thick white wool. *Nutlets* about 3 mm. long, oblong.

HABITAT :—W. Ghats; Nilgiri; Pulney and Anamallaya.

20. Leucas lanceaefolia Desf. in Mem. Mus. Par. xi (1824) 5, t. 2, f. 2; Benth. Lab. Gen. et Sp. 612, and in DC. Prodr. XII 529; Wight Ic. t. 1452; Hook. f. Fl. Brit. Ind. IV 685; Gamble Fl. Madras 1153.

L. lanciformis Wall. Cat. 2759.

A tall bushy *plant*, about 200 cm. high or more; stem and branches stout, terete, rufus-tomentose with erect hairs. *Leaves* short petioled, coriaceous, lanceolate, subacute, cuneate at the base, margin entire and slightly revolute; upper surface scaberulous, white-tomentose beneath; lamina 7-10 cm. long, 1-2·5 cm. broad; petiole ·5-1 cm. long, rather stout. *Whorls* axillary, many- and dense-flowered, about 2·5 cm. in diam.; bracts linear-lanceolate, shorter than the calyx. *Calyx* about 6 mm. long, campanulate, tomentose, straight, not oblique at the mouth; throat minutely villous; teeth minute spreading, spinulose. *Corolla* white, small, tube included.

HABITAT :—W. Ghats; Nilgiri; Pulney hills.

21. Leucas ciliata Benth. Wall. Pl. As. Rar. i 61; Lab. Gen. et Sp. 614, and in DC. Prodr. XII 530; Wall. Cat 2046; Hook. f. Fl. Brit. Ind. IV 687; Cooke Fl. Bomb. Pr. II 471; Gamble Fl. Madras 1153.

A tall subshrubby *herb*, 30-100 cm. high, with straggling-branches; stem and branches obtusely 4-angled, hirsute with deflexed and spreading hairs. *Leaves* shortly petioled, 5-12 cm. long, ovate or lanceolate, acute, coarsely serrate, base narrowed, sparsely pubescent with rather coarse hairs, or more or less glabrate, petiole 5-15 mm. long. *Whorls* large, globose, densely many-flowered, terminal and axillary; bracts nearly as long as the calyx, very slender, ciliate, spinulose. *Calyx* 12-17 mm. long, tubular, straight, hairy outside and with a ring of hairs at the

mouth; teeth 3-4 mm. long, linear or lanceolate, ciliate, spinulose, stellately spreading in fruit. *Corolla* 20-22 mm. long, tube annulate within; upper lip densely bearded with rufus-brown hairs. *Nutlets* 3·5 mm. long, smooth, brown.

HABITAT :—Nepal; Sikkim; Khasia Mts.; Bhutan; W. Ghats; Konkan; Canara; Coorg; Mysore; Travancore.

22. Leucas vestita Benth. Wall. Pl. As. Rar. i 61; Lab. Gen. et Sp. 613, and in DC. Prodr. XII 530; Wight Ic. t. 338; Hook. f. Fl. Brit. Ind. IV 687; Gamble Fl. Madras 1153.

A tall *herb*, tawny villous with spreading hairs; branches square. *Leaves* shortly petioled, 5-10 cm. long, ovate-lanceolate, acute, crenate-serrate, narrowed to the base, villous on both surfaces with somewhat stiff hairs; petiole hirsute. *Whorls* usually solitary, terminal, many- and dense-flowered; bracts nearly as long as calyx, narrowly linear, densely ciliate with long, somewhat bristle-like hairs. *Calyx* about 15 mm. long, tubular, straight, villous outside and at the throat, mouth not oblique; teeth short, slender, erect or spreading. *Corolla* large, upper lip densely bearded with rufus-brown hairs. *Nutlets* 3 mm. long, brown, smooth and shining.

HABITAT :—Travancore; Tinnevelly and Palni Hills; Mysore (?).

23. Leucas lamiifolia Desf. Mem. Mus. Par. xi (1824) 4, t. 2, f. 1; Hook. f. Fl. Brit. Ind. IV 686; Gamble Fl. Madras 1153.

Tall shrubby *plant*, about 250 cm. high, with somewhat straggling, very stout branches, tawny villous in the spreading hairs. *Leaves* shortly petioled, ovate, subacute, crenate serrate, rounded at the base, rarely cordate, villous above, densely tomentose beneath; lamina 7-12 cm. long, 3-6 cm. broad. *Whorls* subglobose, many- and dense-flowered, usually terminating each branch; bracts linear-lanceolate, equalling the calyx. *Calyx* membranous, about 10 mm. long, campanulate, straight, villous outside and at the throat; mouth not oblique; teeth about $\frac{1}{3}$ the length of the tube, slender, erect. *Corolla* small, tube included. *Nutlets* 3 mm. long, oblong.

HABITAT :—W. Ghats; Nilgiris.

24. Leucas prostrata Gamble Fl. Madras 1154 (1924).

L. hirta, var. *prostrata* Hook. f. Fl. Brit. Ind. IV 687.

Low slender *herbs*, with long prostrate or ascending branches from a "knotty" rootstock, pubescent with spreading hairs. *Leaves* usually few, petioled, ovate, obtuse, rounded at the base, obtusely and distantly crenate, tawny hispid on both sides with scattered, more or less bristle-like hairs; lamina 2-4 cm. long, 1-2 cm. broad; petiole ·5-10 mm. long. *Whorls* terminal, densely many-flowered; bracts subulate, nearly as long as the calyx, ciliate. *Calyx* about 10 mm. long, tubular, straight, hispid outside and villous at the mouth; teeth slender, stellately spreading, rather stiff and ciliate with stiff hairs. *Nutlets* about 3 mm. long, oblong, smooth, dusty yellowish in colour.

HABITAT :—W. Ghats ; Nilgiris, above 1,750 m. ; Anamalaya and Shivaroy hills.

25. Leucas hirta Spreng. Syst. ii 743 ; Benth. Lab. Gen. et Sp. 613, and in DC. Prodr. XII 530 ; Hook. f. Fl. Brit. Ind. IV 687 ; Gamble Fl. Madras 1153.

L. helianthemifolia Benth. in Wall. Pl. As. Rar. i 61, and Wall. Cat. 2053, not of Desf.

L. rufescens Benth. in Wall. Cat. 2053.

Phlomis hirta Heyne in Roth. Nov. Sp. 264.

A subshrubby *herb*, with a stout rootstock ; stem woody below, branching above, scabrid. *Leaves* shortly petioled or sessile, narrowly lanceolate, or linear-oblong, obtuse, obscurely crenate, narrowed to the base, very much scabrid on both surfaces ; lamina 3-7 cm. long. *Whorls* terminal, at the ends of branches, rarely axillary ; bracts linear, ciliate, as long as the calyx. *Calyx* 8-12 mm. long, tubular-campanulate, straight, ribbed above, tomentose or villous outside, mouth wide and very densely villous ; teeth short, recurved and stellately spreading, upper lip of corolla densely bearded with white hairs. *Nutlets* 4 mm. long, smooth and shining, deep brown in colour.

HABITAT :—Deccan, from Cuddapah to S. Kanara, and to Tinnevelly.

VAR.—**Beddomei** Hook. f. Fl. Brit. Ind. IV 687 ; Gamble Fl. Madras 1153.

Hairs on stem and leaves rather soft. *Whorls* usually many ; clayx-mouth less villous ; upper lip of corolla bearded with brownish (?) hairs.

HABITAT :—Wynaad.

26. Leucas eriostoma Hook. f. Fl. Brit. Ind. IV 686 ; Gamble Fl. Madras 1154.

A lone, stout *undershrub*, with terete branches, pubescence various. *Leaves* shortly petioled, narrowly lanceolate, obtuse, coarsely serrate, base narrow, hispid on both sides with spreading brownish hairs ; lamina 3-10 cm. long, ·5-2 cm. broad. Whorls many in the upper axils, dense-flowered ; bracts as long as the calyx, linear, pectinately ciliate. *Calyx* 6-12 mm. long, tubular campanulate, straight, glabrous below, villous above the middle ; mouth not oblique, densely villous with a ring of white hairs ; teeth very minute, subulate, stellately spreading. *Corolla* very small, tube included, piloso-annulate. *Nutlets* about 2 mm. long, oblong.

HABITAT :—Wynaad ; Nilgiris ; S. Kanara ; Concan (?).

VAR.—(i) **latifolia** Hook. f. Fl. Brit. Ind. IV 686 ; Gamble Fl. Madras 1154.

More robust in habit, with broader leaves. *Whorls* more numerous, and larger.

HABITAT :—Nilgiris.

VAR.—(ii) **lanata** Hook. f. Fl. Brit. Ind. IV 686 ; Gamble Fl. Madras 1154.

L. lepistoma Herb. Wight.

Hairs upon stem and inflorescence, very dense, white, spreading and soft. *Leaves* oblong-lanceolate, villous. *Whorls* smaller.

HABITAT :—Mysore ; Nilgiris.

27. Leucas stelligera Wall. Pl. As. Rar. i 61 ; Benth. Lab. Gen. et Sp. 61 ; and in DC. Prodr. XII 529 ; Hook. f. Fl. Brit. Ind. IV 686 ; Cooke Fl. Bomb. Pr. II 470 ; Gamble Fl. Madras 1154.

L. eriostoma var. *longifolia* Hook. f. Fl. Brit. Ind. IV 686.

L. hamatula Arn. Pugill. Pl. Ind. Or. 37 ; Benth. in DC. Prodr. XII 529.

Erect branching *herb*, 60-100 cm. high, softly pubescent or villous, with erect and spreading hairs. *Leaves* shortly petioled, narrowly lanceolate, obtuse or subacute, serrate, base usually entire, narrowed to the petiole ; lamina 7-12 cm. long, 1-2 cm. broad ; petiole 5-1 cm. long. Whorls terminal and axillary, densely many-flowered, bracts linear, ciliate, half as long as the calyx or shorter. *Calyx* 6-12 mm. long, tubular-campanulate, straight, constricted in the middle, pubescent or tomentose, slightly ribbed above, glabrescent and smooth below ; mouth not oblique, densely villous ; teeth short, recurved and stellately spreading. *Corolla* white, short ; tube annulate within ; upper lip densely bearded with white hairs. *Nutlets* 3 mm. long, smooth, shining.

HABITAT :—Concan ; Canara ; Mysore ; Nilgiris.

28. Leucas nepetaefolia Benth. in Wall. Pl. As. Rar. i 62, Lab. Gen. et Sp. 609, and in DC. Prodr. XII 527 ; Wall. Cat. 2526 ; Hook. f. Fl. Brit. Ind. IV 681 ; Gamble Fl. Madras 1150.

A small shrubby *plant*, with slender terete branches, slightly hoary ; hairs erect and spreading. *Leaves* petioled, orbicular-acute, obtuse, coarsely crenate, rounded or subcordate at the base, pubescent above, tomentose beneath, lamina about 2·5 cm. in diam. ; petiole very slender about 1 cm. *Whorls* many, axillary, few-flowered ; bracts setaceous. *Calyx* about 10 mm. long, obconic, straight, ribbed, villous outside, teeth short, triangular. *Corolla* small, white, lips nearly equal, the upper bearded with white hairs. *Nutlets* about 2 mm. long, greyish in colour.

HABITAT :—Deccan ; Hyderabad and Guntur.

29. Leucas Helferi Hook. f. Fl. Brit. Ind. IV 681.

Perennial *plants* with sparingly branched procumbent stem, very slender and flexuous, but with wire-like tenacity, 30-60 cm. long, floccose with soft, very fine, long, spreading white wool, which is easily removeable, or stem and leaves often glabrate. *Leaves* short-petioled, membranous, ovate, obtuse, crenate, sometimes silky beneath ; lamina 1·5-2·5 cm. long, petiole very slender, about 1 cm. or shorter. *Whorls* usually

many, axillary, few-flowered; bracts narrow. *Calyx* about 6 mm. long, villous, straight, mouth subequal, throat naked; teeth 10, very minute, subulate, spreading. *Corolla* very small.

HABITAT :—Burma; Tenasserim.

30. Leucas lanata Benth. in Wall. Pl. As. Rar. i 61, Lab. Gen. et Sp. 607, and in DC. Prodr. XII 525; Wall. Cat. 2055; Hook. f. Fl. Brit. Ind. IV 681; Collett Fl. Sim. 405; Prain Beng. Pl. 856; Cooke Fl. Bom. Pr. II 468; Duthie Flor. Upp. Gang. Pl. II 252; Gamble Fl. Madras 1151; Haines Bot. Bih. & Oriss. 747; Doan in Fl. Gen. Indo-Chine, IV 8, (1936) 1022.

L. collina Dalz. in Hook. Kew Journ. ii, 338; Dalz. & Gibs. Bomb. Fl. 211.

Marrubium mollissimum Don. Prodr. 112.

Erect perennial *herb*, much branched from a stout rootstock, softly woolly or subsilky, with erect and spreading hairs. *Leaves* sessile or subsessile, rather thick, ovate, obtuse or acute, crenate-serrate, rounded or cuneate at the base, softly tomentose or silky on both surfaces; lamina 3-6 cm. long, 1·5-3 cm. broad. *Whorls* densely many-flowered, axillary; bracts setaceous, densely hairy, much shorter than the calyx. *Calyx* about 8 mm. long, tubular campanulate, straight, densely silky-villous outside, pubescent within on the upper part; mouth truncate; teeth minute, alternately shorter, triangular-subulate. *Corolla* white, tube annulate within. *Nutlets* 1·5 mm. long, oblong-ovoid, obliquely truncate at the apex.

HABITAT :—Kashmir; Punjab; Kumaon; Garhwal; Nepal; Darjeeling; Burma; Chota-Nagpur; S. India, from Konkan to Carnatic and to the Nilgiri hills.

DISTRIBUTION :—Siam; Indo-China.

31. Leucas Collettii Prain. Journ. As. Soc. Beng. lix (1890) ii 313; Kudo in Mem. Fac. Sc. & Agri. II 2, (1929) 206.

Herbs with a perennial woody rootstock, and short stout stem, 8-15 cm. high, bluntly angled and distinctly grooved; all parts densely silky-villous with soft spreading hairs. *Leaves* thick, close-set, sessile, 1·5 cm. long, 1·25 cm. broad, ovate, acute coarsely serrate, entire near the truncate or subcordate base. *Whorls* many-flowered; bracts short, linear. *Calyx* 5 mm. long, straight, densely silky-villous outside, hairy within, truncate at the mouth; teeth 10, minute erect. *Corolla* 7 mm. long; tube not exserted, annulate.

HABITAT :—Upp. Burma.

DISTRIBUTION :—S. China.

32. Leucas helicterifolia Haines Kew Bull. 1922, 188, and Bot. Bih. & Oris. 748.

Herbs with many subdiffuse stems, 30-50 cm. long; branches quadrangular, densely hispid with long and short, suberect hairs. *Leaves*

shortly petioled, or subsessile, lanceolate, or narrowly oblong-lanceolate, acute, serrate, pubescent above, the hairs swollen at the base, lower surface densely villous, specially on the nerves; petiole of lower leaves up to 5 mm. long. *Whorls* axillary, many-flowered; flowers sessile; bracts setaceous, 2-4 mm. long, pubescent. *Calyx* tubular 7-9 mm. long, tube straight or slightly incurved, outside pubescent on the 10 very prominent nerves, and sparsely silky hairy within; mouth equal; teeth minute erect, triangular, acute, ciliate. *Corolla* white; tube 9-10 mm. long, pubescent; lobes shorter than the tube, the lower longer pubescent beneath.

HABITAT :—Ramnagar hills (Chota-Nagpur) 300-600 m. *Haines* 4995.

33. Leucas teres Benth. Wall. Pl. As. Rar. i, 62, Lab. Gen. et Sp. 608, and in DC. Prodr. XII 526; Hook. f. Fl. Brit. Ind. IV 580; Wall. Cat. 2060.

Perennial shrubby *plants*, with slender long terete branches, hoary-pubescent with deflexed hairs. *Leaves* shortly petioled, 1·5-2·5 cm. long, elliptic obtuse subserrate, scaberulous above, tomentose beneath. *Whorls* numerous, few-flowered, axillary; bracts minute, setaceous. *Calyx* shortly pedicelled, 4-6 mm. long, straight, mouth subequal, throat naked; teeth 10, very minute, subulate. *Corolla* very small. *Nutlets* 1·5 mm. long.

HABITAT :—Burma.

34. Leucas pilosa Benth. in Wall. Pl. As. Rar. i 62, Lab. Gen. et Sp. 609, and in DC. Prodr. XII 526, incl. var. *pubescens*; Wall. Cat. 2058; Hook. f. Fl. Brit. Ind. IV 683.

Perennial *herbs*, with long slender ascending branches, and a stout rootstock; pubescent with adpressed and deflexed hairs, mixed with scattered long spreading hairs. *Leaves* petioled membranous, ovate, acuminate or acute, rounded at the base, coarsely serrate, sparsely hispid on both surfaces or glabrate; lamina 3-7 cm. long, 1·5-3 cm. broad; petiole 1-3 cm., shorter upwards. *Whorls* few-flowered, many, axillary, bracts usually much shorter than the calyx, densely hispid. *Calyx* about 6 mm. long, campanulate, straight densely hispid outside glabrous within; teeth short, acicular at the tips, alternately shorter. *Corolla* small, white; tube exserted, lips very short, subequal. *Nutlets* 1·5 mm. long, truncate at the top, slightly covered with a brownish down.

HABITAT :—Burma.

35. Leucas flaccida R. Br. Prodr. 585; Benth. Lab. Gen. et Sp. 609, and in DC. Prodr. XII 526; Hook. f. Fl. Brit. Ind. IV 684.

L. parviflora Benth. in Wall. Pl. As. Rar. i 62; Wall. Cat. 2061.

L. melissaefolia Benth. in Wall. Pl. As. Rar. i 62.

L. melissaeflora Benth. in Wall. Cat. 2062.

L. decendulata Smith in Rees Cyclop ; Benth. in DC. Prodr. XII 526.

Phlomis moluccana Roxb. Hort. Beng. 95, and Fl. Ind. iii, 11.

A slender flaccid annual *herb*, 15-20 cm. high, with rather weak branches from the base, pubescent or tomentose with deflexed hairs. *Leaves* long-petioled, membranous, ovate or oblong, obtuse or subacute, crenate, cuneate at the base, pubescent or more or less glabrate ; lamina 2·5-5 cm. long ; petiole very slender, 1-2·5 cm. long. *Whorls* few-flowered, many, axillary ; bracts minute, hispid. *Calyx* very shortly pedicelled, about 6 mm. long, pubescent or villous outside, straight or slightly curved ; teeth about ⅓ the length of the tube or shorter, triangular subulate, spinulose, alternately shorter. *Corolla* white, tube much exserted.

HABITAT :—Burma.

36. Leucas biflora R. Br. Prodr. 504 ; Wall. Cat. 2529 ; Benth. in Wall. Pl. As. Rar. i, 62, Lab. Gen. et Sp. 610, and in DC. Prodr. XII 527 ; Wight Ic. t. 866 ; Hook. f. Fl. Brit. Ind. IV 683 ; Trim. Fl. Ceylon, iii, 386 ; Cooke Fl. Bomb. Pr. II 469 ; Gamble Fl. Madras 1150.

Phlomis biflora Vahl. Symb. iii, 77 ; Roxb. Fl. Ind. iii, 12.

Nepeta indica Burm. Fl. Ind. 126, and Thes. Zeyl. t. 63, f. 1.

Slender procumbent *herbs*, with long branches, often ascending or climbing, from a woody rootstock, pubescent with deflexed hairs. *Leaves* petioled, ovate, elliptic or oblong, obtuse, coarsely serrate or crenate, rounded at the base, pubescent on both sides ; lamina 1·5-5 cm. long, ·5-2 cm. broad ; petiole ·6-1 cm. long. *Whorls* 1-4-flowered, rarely more, axillary ; bracts setaceous, minute. *Calyx* 8-9 mm. long, distinctly pedicelled campanulate ; ribbed, hispid outside, sparsely hairy within except below the middle ; teeth triangular-subulate, subequal, ciliate, about ⅓ the length of the tube. *Corolla* white, tube annulate within. *Nutlets* 1·5 mm. long, truncate at the apex, irregularly prominently tuberculate, brown in colour.

HABITAT :—Gujrat ; Konkan to Carnatic, and southwards to Travancore.

DISTRIBUTION :—Ceylon.

VAR.—**procumbens** (Desf.) Gamble in Fl. Madras 1151.

L. procumbens Desf. in Mem. Mus. xi 7, t. 3 ; Benth. in Wall. Pl. As. Rar. i 62, Lab. Gen. et Sp. 610, and in DC. Prodr. XII 527, in part ; Hook. f. Fl. Brit. Ind. IV 683 ; Prain Beng. Pl. 857 ; Cooke Fl. Bomb. Pr. II 470 ; Haines Bot. Bih. & Oris. 749.

L. biflora Wall. Cat. 2063 in part.

Phlomis biflora Roxb. Fl. Ind. iii, 12, in part.

Usually almost glabrous ; *leaves* narrower. *Calyx* with longer pedicels and shorter teeth.

HABITAT :—Kanara ; Mysore ; Palamau ; Bengal.

37. Leucas angularis Benth. in Wall. Pl. As. Rar. i, 62, Lab. Gen. et Sp. 608, and in DC. Prodr. XII 526; Hook. f. Fl. Brit. Ind. IV 684; Gamble Fl. Madras 1151.

L. marrubioides var. *pulneyensis* Hook. f. Fl. Brit. Ind. IV 684.

L. pubescens Thwaites Enum. 240.

Perennial *herbs*, with slender, very long, straggling, ascending or erect stem and branches, pubescent or tomentose with deflexed hairs. Leaves shortly petioled, triangular-ovate, acute, coarsely crenate or serrate, truncate, rounded or subcordate at the base, pubescent on both surfaces; lamina 3-7 cm. long, 1·5-3 cm. broad; petiole about 1 cm. or slightly longer. *Whorls* few- or many-flowered, axillary; bracts subulate, about ½ as long as the calyx. *Calyx* pedicelled, about 12 mm. long, tube cylindric, straight, hispid outside, sparsely hairy within; teeth very slender ⅓ nearly the length of the tube, ciliate. *Corolla* white. *Nutlets* 1·5 mm. long, truncate at the top, greyish brown.

HABITAT:—W. Ghats; Travancore, Nilgiris; Pulney hills.

DISTRIBUTION:—Ceylon.

38. Leucas pubescens Benth. Lab. Gen. et Sp. 610, and in DC. Prodr. XII 628; Hook. f. Fl. Brit. Ind. IV 684; Gamble Fl. Madras 1152.

L. marrubioides Wall. Cat. 2524.

Stout erect *herbs*, pubescent or tomentose with deflexed hairs. *Leaves* petioled, ovate or orbicular, broadly and coarsely crenate, obtuse at the apex, truncate or slightly cuneate at the base, rarely subcordate, pubescent on both sides or softly villous beneath; lamina 2-4 cm. in diam.; petiole 1-1·5 cm. long. *Whorls* axillary densely many-flowered; bracts narrowly lanceolate, or somewhat spathulate, acuminate, almost equalling the calyx. *Calyx* about 10 mm. long, shortly pedicelled, campanulate, straight, hispid outside on the ribs, glabrous or with very few scattered hairs; teeth subequal, subulate, ciliate, about ⅓ the length of the tube. *Corolla* white; upper lip bearded with white hair; lower lip slightly longer than the upper. *Nutlets* 1·5 mm. long, truncate at the top, brown, irregularly and minutely granulate.

HABITAT:—Nilgiri and Pulney hills.

39. Leucas marrubioides Desf. Mem. Mus. Par. xi (1824) 6. t. 3, f. 1; Benth. in Wall. Pl. As. Rar. i 61, Lab. Gen. et Sp. 611, and in DC. Prodr. XII 528; Thwaites Enum. 240; Hook. f. Fl. Brit. Ind. IV 683; Gamble Fl. Madras 1152.

Stout perennial *herbs*, 30-60 cm. high, simple or with straggling branches, densely white tomentose with deflexed hairs. *Leaves* sessile or shortly petioled, thick, ovate, or rounded, obtuse, crenate, base rounded or cordate, velvety above, densely white woolly beneath, often rugose on the upper surface; lamina 2·5-5 cm. in diam. *Whorls* densely many-flowered, axillary; bracts filiform, villous with long, soft silky hairs, nearly as long as the clayx. *Calyx* tubular-campanulate, straight, densely silky-villous outside, glabrous within except the teeth; teeth

unequal filiform, ciliate, about ⅓ the length of the tube. *Corolla* white, tube annulate within. *Nutlets* 1·5 mm. long, obtuse at the apex, brown smooth and shining.

HABITAT :—W. Ghats, from Concan to Travancore, Mysore, Coimbatore, Nilgiris ; Pulney Hills.

DISTRIBUTION :—Ceylon.

40. Leucas chinensis R. Br. Prodr. 504 ; Benth. in DC. Prodr. XII 524 ; Wall. Cat. 2527 ; Hook. f. Fl. Brit. Ind. IV 681 ; Gamble Fl. Madras 1151.

A straggling subshrubby *herb*, very densely white tomentose, or sometimes only hoary. *Leaves* petioled usually thick or coriaceous, rarely membranous, broadly ovate, acute or obtuse, crenate, base cuneate, softly pubescent or tomentose ; lamina 2·5-6 cm. long, 1-3 cm. broad ; petiole 1-3 cm., slender ; often the upper ones sessile. *Whorls* few-flowered, axillary ; bracts setaceous, very minute. *Calyx* distinctly pedicelled, about 10-15 mm. long, funnel-shaped, abruptly dilated at the mouth which is about 6-8 mm. wide ; tube slightly ribbed, densely softly white-villous outside, hairy or almost glabrous within ; teeth broadly triangular, spreading, equal or not, spinulose at the tip. *Corolla* white, lower lip longer than the upper. *Nutlets* 1·5 mm. long, obtusely truncate at the top, brown, minutely tubercular.

HABITAT :—W. Ghats ; Malabar hills ; Anamalaya and Pulney hills.

The distribution of this plant in China does not seem to be correct.

41. Leucas ovata Benth, in Wall. Pl. As. Rar. i, 61, Lab. Gen. et Sp. 607, and in DC. Prodr. XII 525 ; Wall. Cat. 2057 ; Hook. f. Fl. Brit. Ind. IV 682.

Tall perennial *herbs*, about 100 cm. high, branched or simple, with quadrangular stem and branches, tomentose or villous with deflexed hairs. *Leaves* sessile, slightly thick, broadly ovate, obtuse, crenate, cordate at the base, hispid or scabrid above, villous or tomentose beneath ; lamina 2-4 cm. long, 1·5-3 cm. broad. *Whorls* numerous, densely many-flowered, axillary ; bracts minute, or often ½ as long as the calyx or more, linear-subulate, densely hispid. *Calyx* about 6 mm. long, tubular, straight, ribbed, densely hispid or villous outside, minutely puberulous within on the upper part ; teeth short, triangular with acicular tips. *Corolla* white, tube included and slightly exserted, annulate within ; lips short.

HABITAT :—Burma ; Shan States ; Khomi ; Rubi Mines.

42. Leucas montana Spreng. Syst. ii, 742 ; Wall. Cat. 2056 ; Benth. in Wall. Pl. As. Rar. 61, Lab. Gen. et Sp. 607 and in DC. Prodr. XII 525 ; Hook. f. Fl. Brit. Ind. IV 682 ; Prain Beng. Pl. 856 ; Cooke Fl. Bomb. Pr. II 469 ; Gamble Fl. Madras 1151 ; Haines Bot. Bih. & Oriss. 748.

A small shrubby *plant*, with straggling branches, densely softly woolly or tomentose with deflexed hairs. *Leaves* very shortly petioled,

thick, ovate or slightly orbicular, obtuse, rounded at the base, crenate, silky above, or often almost glabrescent; lamina 2·5-5 cm. long, 1·5-3 cm. broad; petiole 3-8 mm. long. Whorls few- or many-flowered, axillary; bracts minute, linear, densely villous. Calyx subsessile, 6-8 mm. long, tubular-campanulate, straight, silky-villous outside, finely pubescent within on the upper half; teeth minute, triangular-subulate, alternately shorter. Corolla white, tube annulate within.

HABITAT :—Purandhar (Poona); Bhor; N. side of Nilgiris; Bellary; Kambakam; Vizagapatam, N. Circars; Orissa; Behar; Chota-Nagpur.

VAR.—(i) **Wightii** Hook. f. Fl. Brit. Ind. IV 682; Gamble Fl. Madras 1151.

Calyx funnel-shaped, 10-12 mm. long. *Whorls* many-flowered. *Leaves* strigose on the upper surface.

HABITAT :—S. India.

VAR.—(ii) **Hamiltoniana** (Wall) Haines Bot. Bih. & Oriss. 749.

L. Hamiltoniana Benth. in Wall. Pl. As. Rar. 61; Lab. Gen. et Sp. 607, and in DC. Prodr. XII 525.

Hairs on stem retrorse; petiole of *leaves* about 9 mm. long, *calyx* sometimes slightly curved.

HABITAT :—Munghyer hills.

VAR.—(iii) **parviflora** Haines Bot. Bih. & Oriss. 794.

Leaves small, ovate-lanceolate, 5-15 mm. long. *Whorls* numerous, 8-10 flowered; *flowers* shortly pedicelled; *calyx* 5 mm. long.

HABITAT :—Angul (Orissa) *Chatterjee.*

43. Leucas mollissima Wall. Pl. As. Rar. i, 62, and Cat. 2054; Benth. Lab. 607, and in DC. Prodr. XII 525; Hook. f. Fl. Brit. Ind. IV 682; Prain Beng. Pl. 856; Cooke Fl. Bomb. Pr. II 469; Trim. Fl. Ceylon III 385; Duthie. Fl. Upp. Gang. Pl. II 252; Gamble Fl. Madras 1151; Merrill Enum. Philipp. Fl. Pl. III 411; Kudo in Mem. Fac. Sc. & Agri. II, 2, (1929) 207; Doan in Fl.-Gen. Indo-Chine, IV 8, (1936) 1023.

L. montana, var. *mollissima* Haines Bot. Bih. & Oriss. 748.

L. Benthamiana Hook. et Arn.

Ballota pilosa Lour. Fl. Coch. var., 364.

Weak slender *herbs*, with straggling or often climbing branches, 100-140 cm. long, pubescent or hoary-tomentose with adpressed hairs. *Leaves* petioled, ovate, or ovate-lanceolate, acute, serrate, cuneate at the base, somewhat strigosely villous above, white tomentose beneath; lamina 3-8 cm. long or more, 1·5-3·5 cm. broad; petiole sometimes up to nearly 2·5 cm. *Whorls* many-flowered, distant, axillary; bracts minute linear, villous. *Calyx* subsessile, 6-8 mm. long, tubular, straight, softly silk-villous outside, pubescent within on the upper part; teeth minute

triangular-subulate, subequal, or alternately shorter. *Corolla* white, tube annulate within. *Nutlets* 2 mm. long, obliquely truncate at the top, brown.

HABITAT :—Kumaon, Nepal ; Khasia Mts. ; Bengal ; Behar ; Chota-Nagpur ; Orissa, Central India ; Concan.

DISTRIBUTION :—Ceylon ; China, Indo-China ; Malaya.

VAR.—(i) **scaberula** Hook. f. Fl. Brit. Ind., IV 682 ; Gamble Fl. Madras 1151.

Almost glabrous ; *calyx* hispid.

HABITAT :—Khasia Mts. ; Central India ; N. Circars ; Godavari valley ; Mysore ; Chota-Nagpur, N.-W. Himalaya, Delhi, Sikkim, Burma.

VAR.—(ii) **angustifolia** Hook. f. Fl. Brit. Ind. IV 682.

L. angustifolia Wall. Pl. As. Rar. i 62, Cat. 2064 ; Benth. in DC. Prodr. XII 527.

Slender ; *leaves* membranous, narrowly lanceolate ; *whorls* few-flowered.

HABITAT :—Nepal ; Burma.

VAR.—(iii) **strigosa** Hook. f. Fl. Brit. Ind. IV 682.

L. strigosa Benth. in Wall. Pl. As. Rar. i, 62, Lab. Gen. et Sp. 608, and in DC. Prodr. XII 526 ; Wall. Cat. 2059.

Slender, strigose ; *leaves* sessile, elliptic- or linear-lanceolate, subacute. *Whorls* few-flowered.

HABITAT :—Burma.

VAR.—(iv) **pilosa** (Haines). Mukerjee *comb. nov.*

L. pilosa, var. *pubescens* Benth. in Wall. Pl. As. Rar. i, 62, and in DC. Prodr. XII 525.

L. montana, var. *pilosa* Haines Bot. Bih. & Oriss. 749.

Leaves thinly hairy above, tomentose beneath ; hairs with thickened base ; *calyx*-teeth about 2 mm. long.

HABITAT :—Rajmahal Hills.

53. Leonotis Pers.

Syn. ii 127 ; Benth. in DC. Prodr. XII 535 ; Hook. f. Fl. Brit. Ind. IV 691, Benth. ex Hook. f. Gen. Pl. II 1214 ; Briq. in Eng. & Pr. Nat. Pflanzenf. iv, 3, a, 246 ; Baker in Thiselton & Dyer, Fl. Trop. Afr. v 490.

Coarse, tall, annual or perennial *herbs*. *Leaves* petioled, ovate, crenate. *Whorls* very dense, axillary. *Flowers* white or yellow. *Calyx-tube* funnel-shaped, arcuate, 8-10 ribbed ; throat oblique ; teeth 8-10, more or less unequal, the upper the largest. *Corolla-tube* as long as the calyx ; limb bilabiate ; upper lip elongated, concave, hairy outside ; lower short, deflexed, with 3 subequal lobes. *Stamens* 4, didynamous,